DOCUMENT RESUME

ED 029 991 08 VT 008 621

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An Analysis of Science Prerequisite Course Work for Home Economics Education Majors. Final Report.

Utah Research Coordinating Unit for Vocational and Technical Education, Salt Lake City.
Spons Agency-Office of Education (DHEW), Washington, D.C.
Bureau No-BR-6-3046
Pub Date Jan 69
Grant-OEG-4-7-063046-1612
Note-86p.
EDRS Price MF-$0.50 HC-$4.40
Descriptors-*Curriculum Research, Degree Requirements, Followup Studies, *Home Economics Education, Questionnaires, *Relevance (Education), School Surveys, *Science Instruction, Scientific Principles, Teacher Attitudes, *Teacher Education Curriculum, Undergraduate Study

Science requirements in home economics undergraduate programs and contributions of science courses to home economics classroom teaching were investigated. Following a review of related literature, college catalogs were surveyed to determine what proportion of American home economics departments required chemistry courses to obtain a bachelor's degree in home economics education. A questionnaire to determine: (1) course work required in the exact sciences, (2) classroom use made of background knowledge gained from the exact science area, and (3) recommendations for curriculum change was developed and administered to 356 graduates of Oregon State University and Texas Technological College where chemistry was not a requirement, and to all the home economics teachers in the state of Utah. Results were compiled into tables of percentages for comparison. Conclusions were: (1) Most colleges and universities required chemistry for home economics education teachers. (2) Chemistry was found useful but not directly applicable to classroom teaching. (3) More emphasis on behavioral sciences was desired by home economics education majors. A bibliography, and instruments used in the study are appended. (FP)

ED029991

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FINAL REPORT

Project No. 6-3046
Grant No. OEG-4-7-063046-1612

AN ANALYSIS OF SCIENCE PREREQUISITE COURSE WORK FOR HOME ECONOMICS EDUCATION MAJORS

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SUMMARY

Most colleges and universities required chemistry as a prerequisite for home economics courses with very few options or alternatives being offered to candidates seeking a bachelor's degree in home economics education. In colleges offering options, many candidates for a bachelor's degree in home economics education still completed some type of chemistry course.

How respondees used chemistry specifically was not part of the investigation; however, the findings indicated that while many teachers found chemistry useful, chemistry principles were not directly applicable to classroom teaching. Nor, did respondees, in spite of this difficulty, do any reviewing or learning of new chemistry principles. Foods, Nutrition and Textiles were the subject matter areas in which chemistry principles were used most often.

While respondents indicated that their college instructors applied chemistry principles to their undergraduate home economics courses, many teachers surveyed believed that chemistry principles used in undergraduate home economics courses could have been sufficiently explained without chemistry as a prerequisite.

The teachers believed that not all major areas in home economics needed chemistry as a prerequisite; however, the majority thought that a chemistry background was definitely necessary for a Food and Nutrition and a Textiles and Related Areas major.

Within the home economics education major, skill oriented classes were listed as the most helpful classes. Professional education classes

and home management courses were consistently listed at the top the least helpful lists.

Art and Related Classes were rated very highly as the most helpful courses taken outside home economics. Courses taken outside home economics found to be least helpful to the teachers in their teaching were Professional Education Classes and Science courses.

A majority of the teachers surveyed indicated the need for increased emphasis in the behavioral sciences in the home economics curriculum. This increased emphasis on behavioral sciences included courses in both the applied and theoretical areas.

The teachers surveyed indicated that the home economics education major did not need as much work in the physical sciences as is now recommended or required. The teachers believed that work in the "life" sciences was of more value than the work in the "physical" sciences.

Chapter I

STATEMENT OF THE PROBLEM

One of the fundamental purposes of home economics education curriculum is to help family members of all ages develop attitudes, appreciations, understandings, and abilities for the purpose of achieveing a satisfying personal, family, and community life. Another cherished purpose is that the curriculum not only enables the student to develop abilities and understandings, but also helps him to live more competently as an informed and effective individual and community member.

Today, social, economic and technical trends become increasingly dominant as determinants of the home economics education curriculum. Although the importance of these trends is recognized, the content of the home economics education curriculum is frequently controversial. Traditionally, the curriculum has been primarily scientifically oriented.[1] Home economists now question if this is a proper orientation for future teachers. If the home economics curriculum is to contribute to society, it should reflect rapid societal changes, and possibly a more liberal background for home economics education majors is necessary as home economics moves toward an emphasis on decision-making in the secondary curriculum.

Home economics education graduates believe that emphasis in those areas concerned with decision-making aspects in using family resources

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[1]Emphasis on and requirement of both physical (generally including several courses in chemistry) and biological sciences is included in the curriculum of home economics majors.

may help students achieve a more satisfying interpersonal relationship. Trends in educational research are emphasizing liberal and interdisciplinary training and are beginning to provide curriculum options designed to meet individual needs and interests. Home economics educators should now determine how to meet challenges put forth by society and education. Whether a scientifically oriented curriculum is the only option to meet these changes is another aspect of critically assessing how the challenges should be met.

Purpose of this study

The purpose of this study was to examine how home economics teachers use chemistry in the homemaking curriculum at the secondary level. More specifically this study hoped to determine:

1. The extent to which the fifty states required science in the home economics education curriculum.
2. The extent to which science was used in the classroom situation.
3. The extent to which classroom teachers who have not had science were handicapped in their teaching.
4. Recommendations for change in the curriculum of home economics education majors.

Procedure

A review of literature was carried out by the researcher pertaining to the inclusion of chemistry in the home economics education curriculum, present trends in teacher education curriculums, and actual changes made in home economics education curriculums.

Following the review of related literature, a survey was made of college catalogs in order to determine what proportion of home economics departments throughout the United States required chemistry courses, to

be completed in order to obtain a bachelor's degree in home economics education. This survey was divided into three groups according to type of institution--land-grant, state, and private universities--each group again being divided by states. At least one university catalog was reviewed for each state under each grouping if a catalog was available. When catalogs were not available--specifically referring to land-grant institutions--or there was a question concerning course requirements, letters were sent inquiring as to specific science courses which must be completed in order to obtain a bachelor's degree in home economics education from the institution in question. Catalogs from all states and under each grouping were not always available, and many of the catalogs available were not the most recent issues from the universities that they represented. Also, some of the inquiries made by letter were not answered, making a completed survey impossible.

After completion of the survey, a questionnaire was developed specifically to determine: (1) course work required in the exact sciences, (2) classroom use made of background knowledge gained from the exact science area, and (3) recommendation for curriculum change. It had been previously determined that Oregon State University, Corvallis, Oregon, and Texas Technological College, Lubbock, Texas, did not require chemistry as a prerequisite for undergraduate courses or as a requirement for graduation. The heads of the Home Economics Education Departments at Oregon State University and Texas Technological College--Dr. May DuBois and Dr. Ann Buntin, respectively--were contacted and asked to cooperate in this study. They both agreed and sent a mailing list of graduates presently teaching in their respective states. Both Dr. DuBois and Dr. Buntin had the opportunity of reviewing the questionnaire and many of

their suggestions were incorporated into the completed questionnaire. Upon completion of the questionnaire, they were sent to all home economics teachers in the state of Utah, graduates of Oregon State University presently teaching in Oregon, and graduates of Texas Technological College presently teaching in Texas. The questionnaires were mailed the first week in April, 1968, and follow-up letters were mailed out two weeks later.

Results were compiled into tables of percentages, with these percentages used for the purpose of comparison. In all cases the bases for the percentages were the number of respondents in each experience grouping. All percentages were rounded off to the nearest whole percent.

Chapter II

REVIEW OF RELATED LITERATURE

Home economics recognizes the family as the basic unit of society and change as the dynamic force in education and the modern world. Home economists also believe that home economics should help all individuals establish, develop, and strive toward the achievement of personal goals and values while also becoming accustomed to change (Anonymous, 1965; Coon, 1964). Hence, the prevailing trends of society should give direction to home economics curriculum. According to Simpson (1965) and others (Martin, 1953; Whitmarsh, 1964; Chilman, 1965; Davis, 1965), these trends were: (1) the new vocational purposes of home economics education and the emerging emphasis on employment education, (2) the increased emphasis on personal relationships and management in the homemaking aspect of the program, (3) the increased concern for contributions of home economics to the education of the culturally and economically disadvantaged, and (4) the increasing interest in home economics for the academically talented.

Temple (1953) and Brown (1960) carried out studies dealing specifically with determining the need for revision and improvement of the basic home economics curriculum. They found that curricula were not meeting the needs of the students, and both studies concluded that the philosophical basis used to formulate the original program had deviated and needed to be reconsidered. Both these studies suggested that a plan be developed for frequent and continuous evaluation of the teaching practices and kinds of learning experiences provided for students in

order to determine whether the teaching practices and learning experiences provided were meeting both professional and family needs. Other studies conducted (Talboy, 1952; Leahy, 1953; Stephens, 1958) also found that home economics curricula were not meeting students' needs, that courses were not functional, and that programs were rigid and inflexible.

Evidence of the preceding studies indicated that the scientifically oriented curricula were not meeting the needs of home economics students. Additionally, whether such emphasis should be put on the importance of chemistry in the teacher education curriculum was questioned. However, there was supporting evidence for the inclusion of chemistry in the curriculum (Lyle, 1957; Lyng, 1960; Blackwell, 1962). Lyng believed that home economists cannot enter the world of industry without a sound and rather extensive background in the basic physical and natural sciences, nor can teachers at any level adequately interpret reference literature or basic teaching aids without at least a basic course in chemistry and physics. Lyng's opinion was the result of her experiences as a foods and nutrition major working as associate director of the home economics department of the Proctor and Gamble Company.

Lyle's study presented some interesting facts relating to the question of chemistry in the curriculum, even though the major purpose of the study was to determine what the alumnae of Iowa State felt were the strengths and weaknesses of their educational program. In this study a stratified random sample of all graduates from 1933-1952 was drawn from a list of those graduates for whom addresses could be located. The strata were nine major areas and year of graduation. There were 1,790 names to whom questionnaires were mailed in the spring of 1954. An 83.6% return was reported, and Lyle concluded that those who answered

were representative of the group. Generally, the graduates were well satisfied with their preparation for marriage and family life as well as for a career. More than half the respondents believed that the present requirements should all remain. With respect to core courses in social sciences, physical and biological science, and humanities, from 53-80% thought the amount of credit now required was satisfactory. Respondees indicated that in the areas of speech, English literature, psychology, American government, social science elective, and physiology should be increased. Areas of highest recommended decrease were economics, chemistry--both organic and inorganic--history, and English composition. It was interesting to note that first decade graduates, those graduating between 1933-1937, were the advocates of decreasing chemistry while the last decade of graduates, or graduates of the years 1948-1952, recommended in significantly large numbers to leave the requirement as it was: eight quarter hours of general chemistry and eight quarter hours of organic chemistry. This may have indicated that the recent graduates, who probably were those presently employed in the labor force, found that chemistry was necessary to their work; however, this opinion may also be the result of their orientation towards chemistry while in school.

In contrast to those advocating keeping chemistry in the curriculum were those that recommended specific alternatives: less emphasis on physical and biological science (Spencer, 1960); a change in emphasis of the chemistry course so that it became more functional for the home economics teacher (Stephens, 1958); the need for a prerequisite course in order that home economics majors may compete with other students enrolled in chemistry courses (Hall, 1958); and more emphasis on the humanities and arts rather than on the physical sciences (Coon, 1964).

Another alternative was suggested by Chapman (1952). A study was made to determine: (1) whether an introductory course in physical science could serve as a substitute for chemistry in most areas of the home economics curricula,[2] (2) what major areas could use this substitute course without jeopardizing their work in required and recommended courses, and (3) what chemical principles should be included in this general survey course. Two questionnaires were used. The first was sent to the heads of home economics departments of 70 colleges and universities in the United States which conferred the education degree. All land grant colleges and state universities as well as other selected universities were included. Following the first questionnaire, another was sent to faculty members of the division of home economics at West Virginia University. Along with this questionnaire was sent an outline of the chemical principles being taught in an introductory physical science course on campus. The results of the first questionnaire indicated that 62.5% of institutions polled still required general chemistry for all candidates for undergraduate degrees in home economics. One-third of these schools offered a general survey course while three-fourths of these schools indicated that they allowed some of their students to use a survey course as a substitute for general chemistry. Analysis of the second questionnaire showed that three-fourths of the department heads thought that a general survey course in physical science could successfully be substituted for majors in Design, Extention, Home

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[2]According to Chapman, the purpose of this course would be to acquaint students with the physical world in which they live, and through integration, present a view of the whole picture of science, pointing out the relationship of a particular field of the physical sciences to the general scheme. Coordinated in the course would be chemistry, physics, geology, astronomy, and mathematics.

service and Commercial Work and Teaching Majors--agreeing with the replies to the same question of the first questionnaire. A substitute for chemistry appeared impossible in only one area: Nutrition and Dietetics and Research in Foods and Nutrition; nor was the class advised for Textiles and Retailing majors. There was one significant difference in the two questionnaires concerning the area of Child Development. This was due to the fact that at West Virginia University, Child Development majors were required to take a course in Child Nutrition which required extensive chemistry background. In this instance, it was not determined that the general survey course would fulfill the requirements. There was a concensus of opinion that a general survey course, which incorporated principles of many areas of science, may be of more benefit to the home economics majors than general chemistry, since this course not only would present students with the basic principles of chemistry but would also broaden their knowledge of other physical sciences.

A study by Stephens (1958) summarized the findings of investigators who advocated specific alternatives for chemistry in the home economics curriculum. This study indicated that in chemistry, a great body of principles and technical terms were required to be learned and memorized and that students showed little ability to solve home economics problems even after taking several courses in chemistry. Administrators as well as graduates were involved in this study. There was a general concensus that programs were not sufficiently functional and that some shifting of courses was needed.

In the present investigator's review of literature, several trends were evident which indicated less emphasis on a scientifically oriented curriculum for home economics education majors. Perhaps, one of the most

recent trends in education today was to liberalize the teacher education programs in order to meet individual needs and interests as well as the challenges of an ever-changing society (Henderson, 1965; Whitehead, 1965; Whitehead, Osborn and Stevens, 1965; Coon, 1964; Lea, 1963). In order that the preparation of teachers become a shared responsibility of the total university, major changes in the conception and design of teacher education curricula were found to be taking place (Hazard, 1967). Some actual reconstruction of curricula was taking place as indicated by the following Michigan State Revised Curriculum (Hannah, 1963), which the writer of this paper found to be representative of most curriculum changes:

1. Reduction of term credits in the core from 38 to 15.
2. General reduction in number of required credits.
3. Careful selection of both professional and pre-professional requirements.
4. Significant increase in block of credits required in general liberal education outside home economics.
5. Increase in number of free electives.
6. Reduction in number of courses requiring manipulative skills.
7. Reduction in number of separate major programs offered.
8. Emphasis on identification of subject matter based on concepts, principles, understandings, attitudes and values, skills and applications which would be most significant to the intellectual growth of the student. (Hannah, 1963, p. 747)

Collins (1965) believed that a liberal education prepared men to make decisions, not only on the job, but also those required of a free man (Collins, however, failed to present his definition of a "free man"). He believed that a liberal education would best enable man to live in a changing world. Studies showed the need for home economics education programs to be planned to provide a broad pattern for education, not

only in home economics, but also in areas outside home economics (Dubois, 1952; Grant, 1953). Studies also reported actual changes in curriculum (Anonymous, 1963; Hannah, 1963; Hazard, 1967) and that graduates were indicating satisfaction with a liberal education along with specialization in a specific major area (Stevens and Osborn, 1965).

In trying to determine how widespread curriculum changes were, Horn (1963) reported a study conducted by the American Home Economics Association to identify the trends that were shown in curriculum changes. In this study, a survey was made of home economics degree-granting institutions. The questionnaire used was based on curriculum revisions that had been reported earlier to the AHEA. These previous reports of revisions were classified under the following headings: (1) reduction of core requirements, (2) more depth, and (3) increased number of electives or specialized courses took place of electives. The questionnaires were sent to a total of 473 colleges consisting of land-grant; denominational; private; state; city, district, or municipal; and several unknown institutions. Replies totaled 212 or a 44.8% return. The replies were then classified according to number and percent of institutions replying by the size of the home economics faculty. The study indicated that major curriculum revisions were made by divisions having more than four faculty members (twelve were divisions having six or more faculty members) while ten institutions reported no changes in the last five years, and twenty institutions indicated that they had made minor changes within the last five years.[3] In general, most

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[3]A change was considered major if it included revamping the basic requirements in home economics subjects as well as requirements in various areas of specialization. Adding, deleting, or substituting courses, changing credits, prerequisites, or emphasis in specific courses were considered minor changes.

institutions reported no change in requirements for B.S., credit requirements in home economics, elective credit requirements, and professional areas offered. However, when changes were reported, almost half the reasons given for either increasing or decreasing the requirements in a specific area were to enable the educators to liberalize the programs or to broaden the students' background. The most significant area of change was centered around course content or emphasis. The predominant pattern of this change was from homemaking to professional objectives.

It was the opinion of Albanese (1962), that the home economists of tomorrow must be educated on the basis of a liberal foundation which will assist them in making the adaptations required in a modern life. While seeking general courses that form a foundation related to home and family life, home economics educators must decide how to relate several areas: general courses, professional courses, and professional purposes. Encompassed in the trend of liberalizing the curriculum was still the question of orientation. Educators needed to consider what supporting arts and sciences as well as what aspects of home economics and what kind of education courses are important in helping future teachers function successfully as individuals and professionals (Coon, 1964).

To do this home economists need to ask themselves what evident trend or trends were important enough to effect a change in the orientation of home economics curricula. Presently, there has been increased emphasis in such behavioral and social science areas as child development, family relationships, and personal and interpersonal relationships (Martin, 1953; Davis, 1965; Spitze, 1965; Tinsley, 1966). Amidon states it in this manner:

> We are in a science of interrelationships. We cannot escape it, if we would. It is in our history; it is in the conditions that affect homes and families. (Amidon, 1960, p. 630)

Society and education recognized the need for emphasis and training in the areas of behavioral sciences for future teachers (Talboy, 1952; Grant, 1953; Spencer, 1960; Johnson, 1962; Whitmarsh, 1964). Miller (1960) along with Cowly (1960) defined the behavioral sciences as the science of man and his association with other men, or those sciences which have impact on human problems of individual and interpersonal relationships. Miller also believed that the reason for the importance of the behavioral sciences not being recognized earlier was due to complex controversies over and within the sciences themselves. This is why he thought that the behavioral sciences appeared abstract, shadowy, and ineffective to the mass; however, he concluded that they can be made very concrete, human, and real, and that a more effective public comprehension of them was essential as they were a way of increasing human happiness.

Not only were the educators realizing the importance of this trend, but home economics graduates and students were demanding an emphasis on behavioral sciences be included in their curricula (Grant, 1953; Berg, 1965; Stevens and Osborn, 1965). Representative of these studies was one by Fehlman (1954). The primary purpose of this study was to evaluate the curriculum core of the department of home economics at the University of Colorado. A questionnaire was sent to all graduates of the department of home economics at the University of Colorado. In this questionnaire, thirty-one years of graduates were covered, during which, no doubt, various instructors emphasized different aspects of the core subjects. Ninety-nine percent of the questionnaires were returned. The questionnaire listed the home economics courses in the core (this core satisfies the lower division requirements of the College of Arts and Sciences and is

primarily scientifically oriented) and asked the graduates to indicate which had been very helpful, somewhat helpful, or not at all helpful in meeting the problems of home and family living. The questionnaire also asked the graduates to list home economics courses they thought desirable to add to the core and other courses they had not elected but which they now felt would aid them. Courses listed by graduates that they felt needed to be added to the core were: marriage, including the philosophy of homemaking; the family, including family problems and suggested solutions; and nursery school, which would require child development prerequisite courses--all courses generally referred to as areas within the behavioral sciences. Courses which graduates wished they had elected included American Government, World Affairs, and all areas of Psychology (child, mental hygiene, social, and adolescent) feeling that these courses were essential to intelligent citizens and would contribute to a better understanding of family problems (It should be noted that other courses were listed; however, next on the list following Psychology was Food Nutrition, included only by 7.8% of the graduates, compared to 31.7% for American Government and World Affairs and 30.5% for Psychology.) Also presented in this study was an analysis of personal data gained from the questionnaire.

Administrators also desired a change of emphasis in the curricula of their teachers (Grant, 1963; Huebner, 1964). In the study by Grant administrators appraised their teachers "average" knowledge of society and suggested that this be an area for improvement. A similar study by Huebner was designed to determine how public school administrators viewed the academic and professional preparation of new secondary school teachers. The questionnaire was sent out to 249 principals in the twenty-two

counties of northern Illinois. More than 74% of the principals returned the questionnaire with the results showing that a much higher percentage favored more professional education: 73% recommended an increase in professional education while 27% stated that the hours in the major should be raised. The results of this study supported those of Grant (1953) which indicated that administrators wanted their teachers to be more proficient in areas of adolescent growth and development and psychology of learning as well as the need for spending more hours student teaching and in methods courses.

Feeling the pressure of the new trends in society and education, graduates, students, administrators, and home economics educators were beginning to change curriculum emphasis at the college level (Hannah, 1963; Chilman, 1965). The curriculum of New York State was evaluated in terms of trends in family living and society (Ostler and Wagner, 1964). The direction provided by these trends pointed the way to a program which integrated and stressed several aspects of home economics: insight and understanding of human growth and development, ability to manage all resources effectively, and appreciation for and competence in developing quality personal and family relationships. The steady rise of women in the labor force implied the need to help young people and adults find fulfillment through both gainful employment and satisfying personal and family living. Trends relating to new understandings of youth and adults with varying abilities, backgrounds and aspirations were also considered along with the fact that knowledge was expanding rapidly and that the need for critical and creative thinking by each individual was necessary. Thus, the core was cut from 28 to 18 credits, and the college dropped its focus on "homemaking" as such and adopted

a program with a two-fold aim: (1) to provide through the facilities of both the college and the university a liberal education in the social and natural sciences, the humanities, and the arts; and (2) to provide specialized instruction based upon these disciplines as preparation for professional careers in which the interest and well-being of the individual, the consumer, and the family were paramount (Anonymous, 1963).

As indicated in the preceding review of literature, numerous studies have been done pertaining to the importance and/or necessity of chemistry in the teacher training programs of home economics. However, no sources could be found by this investigator that were less than ten years old or that made strong recommendations for the inclusion of chemistry in the present home economics curriculum.

Chapter III

FINDINGS OF THE STUDY

This chapter presents the findings of this study based on data collected from (1) a survey of college catalogs of land-grant, state, and private universitites, and (2) a questionnaire sent to all home economics teachers in the state of Utah, graduates of Oregon State University presently teaching in Oregon, and graduates of Texas Technological College presently teaching in Texas.

The data concerning the survey of college catalogs were collected from catalogs available in the Utah State University Libarary and correspondence between the researcher and particular Home Economics Education Departments. Catalogs were selected on the basis of whether a bachelor's degree in home economics education was offered by a [illegible]ar institution.

The data collected concerning the questionnaire were based on replies of 71% of the questionnaires which were sent to 502 home economics teachers in Utah, Oregon, and Texas.

Percentages have been used for the purpose of comparison, and in all cases were based on the number of respondents in experience grouping. All percentages have been rounded off to the nearest whole percent.

Survey of land-grant, state and private universities

The detailed results of the survey of land-grant, state, and private universities can be found in Tables 25, 26, and 27 (Appendix). The results of these tables have been combined below to show: (1) the percent of

land-grant, state, and private unversities which required chemistry as a prerequisite for a bachelor's degree in home economics education and (2) the percent of land-grant, state, and private universities which offered an option of prerequisite science courses to candidates seeking a bachelor's degree in home economics education.

Type of institution	Chemistry required	Option offered	No Home Ec. Ed. program	Unknown
Land-Grant	75%	13%	4%	8%
State	60%	6%	0	34%
Private	40%	6%	0	54%

These results cannot be considered highly significant as a complete survey was impossible due to lack of catalogs and catalogs which were often out of date. However, these findings were supportive of the review of literature in that so many college and university home economics education curriculums required chemistry as a prerequisite for home economics courses with very few options or alternatives being offered to candidates seeking a bachelor's degree in home economics education.

Questionnaire

Five hundred and two questionnaires were sent to home economics teachers in Utah, Oregon and Texas. Seventy-one percent (71%) were returned and enumerated as follows:

	Number sent	Number returned	Percent returned
Utah	302	212	70%
Oregon	153	110	72%
Texas	47	34	72%
Total	502	356	71%

For ease of reporting the returns, the results were categorized as Group I and Group II. Group I consisted of the returns from the Utah home economics teachers; Group II consisted of the combined returns of the Oregon and Texas home economics teachers. Groups I and II were broken down further to enumerate the number of respondents in each experience grouping:

Years of teaching experience	1-5	6-10	11-15	16-20	Over 20	Unknown	Total
Group I	114	36	22	17	12	5	206
Group II	95	24	8	5	7	5	144
Total	209	60	30	22	19	10	350

Six (6) or 1% of the questionnaires could not be used in tabulating the results because the researcher was unable to determine whether chemistry was or was not required as a prerequisite at the institution granting the home economics education degree.

The results of the questionnaire have been affected by certain factors which will be noted here.

1. The "halo effect" should be considered when using a continuum as the basis for replies in a questionnaire. This was the tendency of respondents to reply more frequently in the middle of a continuum as opposed to replying at either end of the continuum. Because a continuum was used as the basis for some of the questions in the questionnaire, these results should be viewed with the "halo effect" in mind.

2. No attempt to define descriptive terms was made by the researcher. Therefore, many responses undoubtedly reflect many individual variances of opinion where descriptive terms were used in the questionnaire.

3. Some responses would have had more relevancy had each respondent replied to all parts of a question as asked for in several multi-part questions. Instead, many respondents replied to only one part of the question as indicated by the high percentage of "No Responses" in these particular questions. This lack of response on the part of the respondents often made it impossible for the researcher to compare responses between experience groupings because a definite opinion was difficult to ascertain.

4. Previously both Oregon State University and Texas Technological College required chemistry, so older teachers graduating from these institutions would have had such courses. Therefore, their replies would undoubtedly reflect this.

5. In some questions, the "No Response" category could not be considered an alternative answer to the question. In such cases, percentages were not computed in the tables for this category.

Table 1. Science courses taken by respondents to complete the requirements for a bachelor's degree in home economics education.

Ninety-nine percent (99%) of the respondents completed a course in

Table 1. Science courses taken by respondents to complete the requirements for a degree in home economics education

Group I

	Semester or quarters completed											
	One Sem.		Two Sem.		One Qtr.		Two Qtr.		Three Qtr.		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Botany	9	4	2	1	17	8	2	1	1	.5	31	15
Biology	17	8	1	.5	68	33	11	5	3	1	100	48
Chem. (General	40	19	10	5	84	41	36	17	35	17	205	99
(Organic	42	20	5	2	84	41	7	3	8	4	146	71
Microbiology	25	12	1	.5	22	11	3	1			51	25
Phys. Science	10	5	5	2	25	12	7	3	7	3	54	26
Physics	14	7	3	1	33	16	3	1	3	1	56	27
Physiology	14	7	3	1	86	42	6	3	3	1	112	54
Zoology	38	18	1	.5	32	16	2	1	1	.5	74	36
Bacteriology	14	7			27	13	3	1	1	.5	45	22
Physio. Chem.					1	.5					1	.5
Biochemistry	3	1			2	1	2	1			7	3
Food Chemistry	1	.5			1	.5	2	1			4	2
Tex. Chemistry	1	.5			3	1					4	2
Genetics					3	1					3	1
Anatomy					1	.5					1	.5
No Response												

Group II

	Semesters or quarters completed											
	One Sem.		Two Sem.		One Qtr.		Two Qtr.		Three Qtr.		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Botany	12	17	1	1	3	2					16	11
Biology	6	4	9	6	1	1	4	3	34	24	54	38
Chem. (General	16	11	18	13	12	8	12	8	54	38	112	78
(Organic	14	10	4	3	14	10	10	7	4	3	46	32
Microbiology	2	1	2	1	7	5	6	4			17	12
Phys. Science	6	4	3	2	4	3	1	1	1	1	15	10
Physics			1	1	13	9	3	2	1	1	18	13
Physiology	8	6	2	1	14	10	57	40	14	10	95	66
Zoology	20	14	7	5	5	3	5	3			37	26
Bacteriology	3	2			12	8	3	2	2	1	20	14
Physio. Chem.												
Biochemistry			1	1	4	3					5	3
Food Chemistry									1	1	1	1
Tex. Chemistry												
Genetics												
Anatomy	1	1									1	1
No Response												

general chemistry. This was the highest percent reported by the respondents in Group I. Fifty-four percent (54%) of Group I also completed some kind of physiology course; however, it was not known whether this was done voluntarily or because of curriculum requirement.

In Group II, where chemistry was an option rather than a requirement, 66% of the respondents reported that physiology was the most frequently completed science course. While the teachers in Group II were not required to take chemistry as undergraduates, many of them reported doing so: 77% completed general chemistry and 32% completed organic chemistry.

Table 2. Responses as to the usefulness of chemistry in teaching home economics at the secondary level. Here the researcher attempted to ascertain the usefulness of chemistry in teaching home economics at the junior and senior high school level. While 14% of the respondents in Group I replied that chemistry was either "Extremely" or "Most" useful, 49% found it "Useful" and 39% found chemistry either of "Little" or "No" use in their teaching. The results reported by the teachers in Group II were similar; 26% of them reported that chemistry was either "Extremely" or "Most" useful while 42% reported it "Useful" and 33% replied that chemistry was of "Little" or "No" use to them in their teaching.

Years of teaching experience appeared to have little definite affect on the opinion of the respondents as to the usefulness of chemistry in their teaching. Group I teachers with 1-5, 11-15, and Over 20 years of teaching experience found chemistry to be useful in their teaching while the majority of teachers with 6-10 and 16-20 years of teaching experience found chemistry of little use in their teaching.

Table 2. Responses as to the usefulness of chemistry in teaching home economics at the secondary level

Group I

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Extremely useful	4	4	1	3	1	5	0	0	1	8	0	0	7	4
Most useful	10	10	4	11	0	0	2	13	4	33	0	0	20	10
Useful	53	48	8	23	12	57	6	38	7	58	1	20	97	49
Little use	37	33	20	57	8	37	8	50	0	0	2	40	65	33
No use	7	6	2	6	0	0	0	0	0	0	2	40	11	6
No response	3		1		1		1		0		0		6	

Group II

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Extremely useful	3	4	0	0	0	0	0	0	0	0	0	0	3	3
Most useful	13	19	5	22	3	43	2	40	3	43	0	0	26	23
Useful	31	45	9	39	1	14	2	40	3	43	2	50	48	42
Little use	17	25	9	39	3	43	1	20	1	14	1	25	32	28
No use	5	7	0	0	0	0	0	0	0	0	1	25	6	5
No response	26		1		1		0		0		1		29	

In Group II, a majority of all the teachers found chemistry useful in teaching.

Table 3. Responses as to the direct application of chemistry principles in teaching home economics at the secondary level. Only eleven percent (11%) of the respondents in Group I found chemistry principles directly applicable either "Always" or "Very Often" in teaching home economics; 23% thought chemistry principles could be applied "Often." However, 67% responded that chemistry principles could be applied only "Once-in-a-While" or "Never." Replies were similar in Group II: 22% found chemistry applicable either "Always" or "Very Often," 22% found it applicable "Often," and 57% found it applicable either "Once-in-a-While" or"Never." In both groups the majority of respondents indicated that chemistry principles were not directly applicable to their teaching. A comparison of the results of Tables 2 and 3 was necessary since there seemed to be some contradiction. Respondents in Table 2 found that chemistry was useful in their teaching; but in Table 3 chemistry principles were not found to be directly applicable.

Table 4. Subject matter areas in which home economics teachers indicated use made of chemistry principles in teaching home economics at the secondary level. This table pertains to the particular subject matter areas at the secondary level in which chemistry principles were used. Both groups of teachers named three subject matter areas in which chemistry principles were used most frequently: Foods, Nutrition, and Textiles, in that order. This listing seemed valid inasmuch as these subject matter areas were those in which chemistry principles were perhaps most often applied at the college level. Twenty-two percent (22%) of the respondents in Group II did not respond.

Table 3. Responses as to the direct application of chemistry principles in teaching home economics at the secondary level

Group I

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Always	1	1	1	3	1	5							3	1
Very often	15	13					2	12	1	8			18	9
Often	20	18	9	25	8	36	3	18	4	33	1	20	45	22
Once-in-a-while	63	55	22	61	12	56	10	59	7	58	1	20	115	56
Never	9	8	4	11			1	6			3	60	17	8
No response	6	5			1	5	1	6					8	4

Group II

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Always	2	2	1	4	1	12							4	3
Very often	10	10	4	16	2	25	1	20	3	43			20	14
Often	17	18	6	25	1	12	1	20			1	20	26	18
Once-in-a-while	31	33	12	50	2	25	3	60	4	57	3	60	55	38
Never	11	12											11	7
No response	24	25	1	4	2	25					1	20	28	19

Table 4. Subject matter areas in which home economics teachers indicated use made of chemistry principles in teaching home economics at the secondary level

Group I

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Foods	76	67	22	61	17	77	15	88	9	75	3	60	142	69
Nutrition	86	75	22	61	18	82	16	94	10	83	2	40	154	75
Textiles	52	46	24	67	13	59	9	53	9	75	3	60	110	54
Laundering	39	34	14	39	8	36	8	47	6	50	1	20	76	37
Cloth. Care	19	17	4	11	3	14	2	12	4	33	1	20	33	16
Child Devel.	1	1	1	3									2	1
Home Mgt.													0	0
Housing													0	0
No response	6	5	1	3	1	5	1	6			2	40	11	5

Group II

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Foods	62	28	22	92	7	87	5	100	7	100	4	80	107	74
Nutrition	51	23	16	67	6	75	5	100	7	100	4	80	89	62
Textiles	43	19	14	58	5	62	3	60	6	86	2	40	73	51
Laundering	24	11	9	38	4	50	3	60	3	43	1	20	44	31
Cloth. Care	10	5	5	21	2	25	2	40	3	43			22	15
Child Devel.	4	2	3	12	3	38					1	20	11	8
Home Mgt.					1	12							1	1
Housing	1	.5			1	12							2	1
No response	29	13	1	4	1	12					1	20	32	22

Teachers with more years of teaching experience from both Group I and II appeared to have used chemistry principles more frequently in Foods, Nutrition, and Textiles than teachers in both groups with fewer years of teaching experience. This also was true for the other subject matter areas that were also listed.

Table 5. Responses as to the need for reviewing or learning other chemistry principles in order to use them in teaching home economics at the secondary level. This table indicated that teachers in both groups did not find it necessary to review or learn other chemistry principles despite the number of years of teaching experience they had had.

Table 6. Undergraduate home economics courses taken by respondents which required chemistry as a prerequisite. In Table 6 both groups named three subject matter areas which most frequently required chemistry as a prerequisite: Nutrition, Foods, and Textiles. The responses were similar for all groupings of years of teaching experience. In Group II the response "None" received the highest percentage of replies, and this seemed consistent with the fact that they were not required to take chemistry; however, one might wonder why this response did not receive all of the replies in Group II. Examination of the Oregon State University and Texas Technological College catalogs supplied the answer. Despite the fact that chemistry was not required at Oregon State University and an option offered, some of the foods courses still required chemistry as a prerequisite. Whether the respondents took these food classes would depend on the option selected. This was not true at Texas Technological College as none of the foods or nutrition classes required chemistry as a prerequisite for home economics education majors.

Table 7. Opinions of respondents as to whether college instructors

Table 5. Responses as to the need for reviewing or learning other chemistry principles in order to use them in teaching home economics at the secondary level

Group I

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Always	2	2	2	6			1	7					5	3
Very often	12	11							2	18	1	20	15	8
Often	16	15	7	21	3	14	4	29	2	18	1	20	33	17
Once-in-a-while	58	55	20	59	15	68	8	57	4	36	1	20	106	55
Never	18	17	5	15	4	18	1	7	3	27	2	40	33	17
No response	8		2				3		1				14	

Group II

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Always	2	3							1	14			3	3
Very often	10	14	1	5	1	14	2	40			1	33	15	13
Often	15	20	7	32	1	14			2	29			25	21
Once-in-a-while	30	41	12	53	4	57	3	60	4	57	2	67	55	47
Never	17	23	2	9	1	14							20	17
No response	21		2		1						2		26	

Table 6. Undergraduate home economics courses taken by respondents which required chemistry as a prerequisite

Group I

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Foods	65	57	19	53	13	59	9	53	7	58	2	40	115	56
Nutrition	86	75	27	75	16	73	10	59	9	75	2	40	150	73
Textiles	41	36	11	31	9	41	4	24	7	58	1	20	73	36
None	12	11	5	14	3	14	4	24	1	8			25	12
No response	2	2	3	8			1	6	1	8	2	40	9	4

Group II

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Foods	27	22	9	38	4	50	3	60	4	57	1	20	48	33
Nutrition	25	21	12	50	5	62	3	60	6	86	1	20	52	36
Textiles	8	7	4	16	2	25	1	20	3	43	1	20	19	13
None	53	44	8	33	2	25			1	14	3	60	67	47
No response	7	6	2	8			1	20			1	20	11	8

Table 7. Opinions of respondents as to whether college instructors applied chemistry principles when teaching undergraduate home economics courses

Group I

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Always	8	7	1	3	1	5	1	7					11	6
Very often	21	19	2	6	2	10			2	25	1	25	28	15
Often	23	21	6	19	1	5	2	13	1	13	1	25	34	18
Sometimes	46	42	15	49	13	62	9	60	3	38			86	46
Never	11	11	7	23	4	19	3	20	2	25	2	50	29	15
No response	5		5		1		2		4		1		18	

Group II

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Always	8	15	3	16	1	17					1	33	13	14
Very often	15	28	1	5	1	17	1	25	3	43			21	23
Often	11	21	4	21			1	25	2	29	1	33	19	21
Sometimes	16	30	9	47	4	67	2	50	2	29	1	33	34	37
Never	3	6	2	11									5	6
No response	42		5		2		1				2		52	

applied chemistry principles when teaching undergraduate home economics courses. Eighty-Five percent (85%) of Group I respondents and 95% of Group II respondents indicated that their college instructors of home economics applied chemistry principles when teaching undergraduate subject matter areas; however, the number of times applications were made ranged from "Sometimes" to "Always." The response "Sometimes" received the highest number of replies in both groups (46% in Group I and 37% in Group II).

Table 8. Responses as to whether chemistry principles used in undergraduate home economics courses could have been sufficiently explained for the purpose of the class without chemistry as a prerequisite. This table reported the respondents' opinions as to whether chemistry principles used in undergraduate home economics courses could have been sufficiently explained for the purpose of the class without chemistry as a prerequisite. Fifty-six percent of the respondents from Group I replied "Yes" and 44% replied "No." Eleven people in this group did not reply. Fifty-six percent (56%) of the respondents in Group II replied "Yes," forty-four percent (44%) said "No," and 20 people did not reply.

The number of years teaching experience did not appear to affect the opinions of the teachers as at least 50% of the respondents in all experience groupings in both Group I and Group II replied "Yes."

Table 9. Opinions of respondents as to whether they were able to apply chemistry principles to college home economics courses without clarification by the instructor. Sixty-eight percent (68%) of Group I respondents and 73% of Group II respondents indicated that they were able to apply chemistry principles to their college home economics courses without clarification by the instructor.

Table 8. Responses as to whether chemistry principles used in undergraduate home economics courses could have been sufficiently explained for the purpose of the class without chemistry as a prerequisite

Group I

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Yes	54	50	23	72	13	62	10	63	7	58	3	60	110	56
No	55	50	9	28	8	38	6	37	5	42	2	40	85	44
No response	5		4		1		1						11	

Group II

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Yes	45	57	11	50	4	57	4	80	4	57	2	50	70	56
No	34	43	11	50	3	43	1	20	3	43	2	50	54	44
No response	16		2		1						1		20	

Table 9. Opinions of respondents as to whether they were able to apply chemistry principles to college home economics courses without clarification by instructor

Group I

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Yes	67	71	16	53	12	75	8	67	5	100	1	33	109	68
No	27	29	14	47	4	25	4	33			2	67	51	32
No response	20		6		6		5		7		2		46	

Group II

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Yes	50	71	13	81	5	83	3	60	4	57	3	100	78	73
No	20	29	3	19	1	17	2	40	3	43			29	29
No response	25		8		2						2		37	

Table 10. Responses as to the need for college instructors to clarify the application of chemistry principles to undergraduate home economics courses requiring chemistry as a prerequisite. Seventy-three percent (73%) of the respondents from Group I and 69% of the respondents from Group II indicated that it was necessary for the instructor to clarify the application of chemistry principles to the undergraduate home economics courses.

Question four was written to elicit two separate answers (Table 9 and Table 10) from each respondent; however, once the initial response was made, many of the respondents failed to respond to the second part of the question, thus lessening the significance of the results and introducing a contradiction between the results of these two tables.

Table 11. Responses as to whether chemistry was necessary for a basic understanding of subject matter for major areas in home economics. Both groups indicated that two major areas needed chemistry as a prerequisite for a basic understanding: (1) Foods and Nutrition, and (2) Textiles and Related Areas. There was a tendency in both groups for the teachers with 1-5 years of teaching experience to indicate more often that chemistry was needed for a basic understanding in all subject matter areas mentioned on the questionnaire.

Table 12. Opinions of respondents as to whether chemistry was unnecessary for a basic understanding of subject matter for major areas in home economics. Both groups indicated three major areas that did not need chemistry as a prerequisite for a basic understanding: (1) Child Development, (2) Home Management and Family Economics, and (3) General Home Economics.

Tables 13-24 reported results of the questions written to determine

Table 10. Responses as to the need for college instructors to clarify the application of chemistry principles to undergraduate home economics courses requiring chemistry as a prerequisite.

Group I

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Yes	51	72	16	76	8	57	11	100	2	67	2	50	90	73
No	20	28	5	24	6	43			1	33	2	50	34	27
No response	43		15		8		6		9		1		82	

Group II

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Yes	39	70	7	64	1	50			3	60	3	100	53	69
No	17	30	4	36	1	50			2	40			24	31
No response	39		13		6		5		2		2		67	

Table 11. Responses as to whether chemistry was necessary for a basic understanding of subject matter for major areas in home economics

Group I

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Gen.Home Ec.	37	33	6	17	4	18	5	29			1	20	53	26
Home Mgt. & Fam. Econ.	11	10	3	8	2	9	2	12			1	20	19	9
Home Ec.Ed.	50	44	9	25	4	18	2	12	4	33	1	20	70	34
Food and Nutrition	104	91	33	92	20	91	16	94	12	100	4	80	189	92
Textiles & Rel. Areas	94	83	30	83	18	82	14	82	11	92	4	80	171	83
Child Dev.	4	4	3	8			1	6	1	8			9	4
Housing			1	3			1	6					2	1
No response	4	4	1	3	2	5	1	6			1	20	9	4

Group II

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Gen.Home Ec.	29	31	2	8	3	38			2	20	1	29	37	26
Home Mgt. & Fam. Econ.	12	13	1	4	3	38			1	14	2	40	19	13
Home Ec.Ed.	46	48	9	38	4	50			3	43	2	40	64	44
Food and Nutrition	89	84	21	88	8	100	5	100	7	100	5	100	135	94
Textiles & Rel. Areas	83	88	20	83	5	62	5	100	7	100	5	100	125	87
Child Dev.	4	4	2	8	3	38			2	29	2	40	13	9
Housing	2	2			1	12							3	2
No response	4	4	2	8									6	4

Table 12. Opinions of respondents as to whether chemistry was unnecessary for a basic understanding of subject matter for major areas in home economics

Group I

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Gen.Home Ec.	58	51	19	53	8	36	8	47	10	83	2	40	105	51
Home Mgt. & Fam. Econ.	78	68	24	67	9	41	9	53	7	58	3	60	130	63
Home Ec.Ed.	46	40	17	47	6	27	7	41	3	25	2	40	81	39
Food and Nutrition	4	4	2	5									6	3
Textiles & Rel. Areas	13	11	4	11	1	5	2	12	1	8			21	10
Child Dev.	86	75	23	64	9	41	9	53	8	67	3	60	138	67
Housing	1	1											1	.5
No response	22	19	10	28	13	59	8	47	2	17	2	40	57	28

Group II

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Gen.Home Ec.	60	63	8	33	5	100	3	43	3	43	3	60	82	57
Home Mgt. & Fam. Econ.	71	75	15	63	3	38	5	100	4	57	2	40	100	69
Home Ec.Ed.	43	45	9	38	1	12	5	100	2	29	2	40	62	43
Food and Nutrition	4	4	1	4	0	0							5	3
Textiles & Rel. Areas	7	7	2	8	2	25							11	8
Child Dev.	76	80	13	54	4	50	5	100	3	43	2	40	103	72
Housing	2	2											2	1
No response	15	16	8	33	3	38			2	29	1	20	29	20

opinions and to elicit recommendations to strengthen the home economics education curriculum. These tables were not divided into Group I and Group II, as were the preceeding tables; the results of both groups have been combined since the question of whether chemistry was or was not taken by the respondents was not now relevant to the findings.

Table 13. Home economics subject matter areas rated "most" helpful by respondents. The total group agreed that (1) Foods, (2) Clothing, (3) Nutrition, (4) Child Development, and (5) Textiles were the most helpful subject matter areas.

Teachers with 1-5 years of experience responded most heavily to this question and their responses were similar to that of the total group with only a difference in priority: (1) Clothing, (2) Foods, (3) Nutrition, (4) Child Development, and (5) Textiles.

Table 14. Home economics subject matter areas rated "least" helpful by respondents. Responses indicated that two subject matter areas were rated by the respondents to be the least helpful subject matter areas: (1) Professional Education courses (not including home economics education courses) and (2) Home Management; however, a significant number of respondents did not reply. Percentages were not computed for this table due to the small number of responses made.

Table 15. Courses taken outside home economics found to be helpful to respondents in teaching home economics at the secondary level. The home economics education curriculum required courses be taken outside the home economics area. Table 15 indicated that respondents found courses outside home economics helpful to them in their teaching. Because no limitations were made on this question, it became necessary for the researcher to group similar responses. No criteria was set up for the grouping since the responses seemed to group themselves.

Table 13. Home economics subject matter areas rated "most" helpful by respondents

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Foods	104	50	32	53	16	53	9	41	9	47	6	60	176	50
Nutrition	98	47	24	40	14	47	11	50	7	37	4	40	158	45
Clothing	107	51	25	42	12	40	6	27	5	26	5	50	160	46
Textiles	71	34	16	27	12	40	4	18	4	21	3	30	111	32
Family Relations	37	18	12	20	6	20	3	14	2	11	1	10	61	16
Child Development	85	41	18	30	9	30	10	45	5	26	5	50	132	38
Home Management	66	32	9	15	7	23	6	27	2	11	2	20	93	27
Housing	40	19	9	15	1	3	2	9	1	5			53	15
Professional Education	13	6	1	2	1	3			1	5			16	5
Home Economics Education	57	27	11	18	5	17	7	32	2	11	2	20	84	24
General Home Economics	8	4			2	7			1	5	1	10	12	3
No Response	33	16	22	37	10	33	10	45	9	47	3	30	88	25

Table 14. Home economics subject matter areas rated "least" helpful by respondents

	Years of teaching experience						
	1-5	6-10	11-15	16-20	Over 20	Unknown	Total
	Number	Number	Number	Number	Number	Number	Number
Foods	4		1	1			6
Nutrition	4	6	1				11
Clothing	17	1	2	1			21
Textiles	8	2	1				11
Family Relations	9		2				11
Child Development	7						7
Home Management	32	13	6	3	2	3	59
Housing	6	2			1		9
Professional Education	60	14	8	2	4		88
Home Economics Education	19	4	3		1		27
General Home Economics	12	2		1			15
No response	98	35	12	17	13	7	182

Table 15. Courses taken outside home economics found to be helpful to respondents in teaching home economics at the secondary level

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Art and Related Areas	184	88	51	85	29	93	21	95	22	116	13	130	319	91
Communication Skills	78	37	24	40	12	40	9	41	11	58	5	50	139	40
History and Political Science	16	8	3	5	2	7			3	16	2	20	26	7
Behavioral Science	102	49	33	55	15	50	5	23	8	42	4	40	167	48
Science Courses	25	12	7	12	1	3	2	9			1	10	36	10
Business Courses	18	9	9	15	7	23	5	23	1	5	2	20	42	12
Mathematics	15	7	5	8	4	13	4	18	6	32	1	10	35	10
The Humanities	6	3	5	8	1	3	1	5	3	16	2	20	18	5
Professional Education Classes	21	10	6	10	2	7	2	9	2	11	1	10	34	10
Physical Education	1	.5	1	2	1	3	1	5	1	5			5	1
Horticulture	2	1											2	.6
No Response	38	18	6	10	3	10	3	14			1	10	51	15

Art and Related Areas received the highest number of responses with 91% of the replies. This grouping included not only basic art and design classes but also such related courses as interior design, flower arrangement, houseplanning, and architectural drawing. Next in priority on the list were the behavioral sciences. This grouping is self-explanatory. Following the behavioral sciences in priority were the Communication Skills. Included in this grouping were English, literature, and speech courses.

When comparing the teachers with a different number of years of teaching experience, it was possible to see a slight difference of opinion. The teachers with 1-5, 6-10, and 11-15 years of teaching experience replied with the following priority: (1) Art and Related Areas, (2) Behavioral Sciences, and (3) Communication Skills; however, the teachers with 16-20 and Over 20 years of teaching experience replied slightly differently: (1) Art and Related Areas, (2) Communication Skills, and (3) Behavioral Sciences.

Table 16. Courses taken outside home economics found to be least helpful to respondents in teaching home economics at the secondary level.

Courses taken outside home economics found to be least helpful to respondents in teaching home economics were: (1) Professional Education classes and (2) Science courses, and each individual grouping of teachers with different numbers of years of teaching experience replied identically to the response of the total group. However, a significant number of respondents did not reply to this question. Included in this category along with the non-responses were also those responses such as "all courses were helpful to me" or "I learned something from each course," since they were not the specific response asked for in the question. Percentages were not computed for this table due to the

Table 16. Courses taken outside home economics found to be "least" helpful to respondents in teaching home economics at the secondary level

	Years of teaching experience						
	1-5	6-10	11-15	16-20	Over 20	Unknown	Total
	Number	Number	Number	Number	Number	Number	Number
Mathematics	13	1		1	2	1	18
Humanities	13	3	1		2		19
Professional Education Classes	35	12	13	11	5	4	80
Physical Education	8	4	3			2	17
Horticulture	6						6
Communication Skills	15	4	1		1	1	22
History and Political Science	8	7		4	1		20
Science Courses	32	8	5	6	5	4	60
Business Courses	4	3	1		3	1	12
Art	1	1					2
Behavioral Sciences	6	2		2		1	11
No response	50	32	11	9	6	3	111

small number of responses made.

Table 17. Opinions of respondents as to the need for increased emphasis on behavioral sciences in the home economics education curriculum. Indicated in this table was the opinion of the respondents as to whether they thought that there was an actual need for increased emphasis on the behavioral sciences in the home economics curriculum in view of their teaching experiences. Eighty percent (80%) of the respondents said "Yes" as opposed to 20% who replied "No." Those responding "No" thought that the emphasis on behavioral sciences in the present curriculum was adequate or that the curriculum could not accomodate additional work.

Table 18. Recommendations for addition of specific courses in behavioral sciences. Table 18 listed respondents' specific recommendations for additional course work in the behavioral sciences. The four recommendations receiving highest priority were: Adolescent Psychology, Sociology, Psychology, and Anthropology; however, the validity of these results must be questioned because of the introduction of bias into the response through the use of examples in this question and the next one.

Table 19. Opinions of respondents as to the need for increased emphasis on applied behavioral sciences in the home economics education curriculum. Table 19 indicated that 82% of the respondents believed there should be an increased emphasis on "applied" behavior sciences in the home economics education curriculum. Eighteen percent (18%) said "No" and 20 persons did not reply.

Table 20. Opinions of respondents as to the need for continued emphasis on physical sciences for a general education in the home economics education curriculum. Fifty-four percent (54%) of the respondents thought there was a continued need for emphasis on the

Table 17. Opinions of respondents as to the need for increased emphasis on behavioral sciences in the home economics curriculum

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Yes	151	77	46	78	24	89	18	86	18	95	9	90	266	80
No	46	23	13	22	3	11	3	14	1	5	1	10	67	20
No response	12		1		3		1						17	

Table 18. Recommendations for addition of specific courses in behavioral sciences

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Psychology	35	17	16	27	6	20	1	5	3	16	1	10	62	18
Adolescent Psychology	110	53	35	58	21	70	16	73	10	52	7	70	199	57
Sociology	79	38	23	38	8	27	12	54	8	42	2	20	132	35
Anthropology	18	9	7	12	4	13	2	9	2	11	3	30	36	10
Group Processes	14	7	1	2			1	5			2	20	18	5
Counseling & Guidance	5	2	4	7	1	3							10	3
The Family	11	5	1	2	1	3	2	9	1	5			16	5
Human Growth & Development	5	2	2	3									7	2
Low Income	4	2			2	7	1	5	1	5			8	2
Evaluation	7	3			2	7	2	9					11	3
No response	62	30	17	28	6	20	4	18	5	26	3	30	97	27

Table 19. Opinions of respondents as to the need for increased emphasis on applied behavioral sciences in the home economics education curriculum

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Yes	169	81	51	91	24	86	20	100	16	84	7	78	287	82
No	29	19	5	9	4	14			3	16	2	22	43	18
No response	11		4		2		2				1		20	

Table 20. Opinions of respondents as to the need for continued emphasis on physical sciences for a general education in the home economics education curriculum

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Yes	111	59	26	49	10	43	7	41	6	50	4	50	164	54
No	78	41	27	51	13	57	10	59	6	50	4	50	138	46
No response	20		7		7		5		7		2		48	

physical sciences in the home economics curriculum for a general education as opposed to 46% that said the continued emphasis on the physical sciences was not necessary. Forty-eight respondents did not reply.

Table 21. Opinions of respondents as to the need for continued emphasis on physical sciences for a home economics education major in the home economics curriculum. Forty-four percent (44%) of the respondents thought that a continued emphasis on the physical sciences was needed for a home economics education major in the home economics curriculum; however, 56% of the respondents did not think a continued emphasis was necessary. Forty-five respondents did not reply.

Table 22. Opinions of respondents as to the need for continued emphasis on physical sciences for pursuit of graduate work in home economics. Concerning the pursuit of graduate work, 68% of the respondents felt that there should be a continued emphasis on the physical sciences; 32% said "No" and 71 persons did not reply. Many of the respondents qualified their answers on this question concerning graduate work by saying "depending on major area or field," thereby reducing the significance of the question.

Table 23. The recommendations of respondents for additional emphasis on science courses in the home economics curriculum. The science course receiving the most favorable recommendation for addition to the curriculum was Physiology (31%) followed by Bacteriology with 29% and Biology with 19%. In listing the recommendations in hierarchial order, the sciences that were highest in priority were "life" sciences as opposed to "physical" sciences (chemistry) which may imply that the teachers found these more helpful in teaching such subjects as human growth and development and sex education. Chemistry was the only physical science included in the first five recommendations, and it was fifth in priority. Thirty-five percent (35%) of the respondents did not respond to this question.

Table 21. Opinions of respondents as to the need for continued emphasis on physical sciences for a home economics education major in the home economics curriculum

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Yes	81	44	22	42	11	41	7	35	9	60	3	43	133	44
No	103	56	30	58	16	59	13	65	6	40	4	57	172	56
No response	25		8		3		2		4		3		45	

Table 22. Opinions of respondents as to the need for continued emphasis on physical sciences for pursuit of graduate work in home economics

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Yes	119	70	30	67	15	68	11	69	12	80	3	37	190	68
No	50	30	19	33	7	32	5	31	3	20	5	63	89	32
No response	40		11		8		6		4		2		71	

Table 23. The recommendations of respondents for additional emphasis on science courses in the home economics curriculum

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Microbiology	31	15	3	5	2	7	1	5					37	11
Chemistry	17	8	8	13	4	13	2	9	2	11			33	9
Biology	41	20	10	17	6	20	3	14	4	21	3	30	67	19
Bacteriology	62	30	16	27	7	23	7	32	8	42	3	30	103	29
Physiology	70	34	12	20	7	23	11	50	7	37	3	30	110	31
Genetics							1	5					1	.3
Zoology	10	5					2	9					12	3
Physics	3	1	2	3					2	11	1	10	8	2
Botany	5	2	1	2									6	2
Anatomy	5	2	1	2									6	2
General Science	2	1	1	2									3	.9
Health	2	1											2	.6
Oceanography	1	.5											1	.3
Animal Science	1	.5											1	.3
No response	62	30	29	48	13	43	9	41	5	26	5	10	123	35

This table also indicated quite a difference of opinion between the teachers with different numbers of years of teaching experience as to which science courses might be added to the home economics curriculum. The teachers with 1-5 years of experience recommended Physiology, Bacteriology, Biology, and Microbiology; 6-10 years recommended Bacteriology, Biology and Physiology, and Chemistry; 11-15 years recommended Biology, Bacteriology, and Physiology with each receiving 2% of the replies; 16-20 years recommended Physiology and Bacteriology; and Over 20 years recommended Bacteriology and Physiology and Biology.

Table 24. Recommendations of respondents for additional work in the home economics curriculum to strengthen the home economics major.

This last question of the questionnaire was deliberately open-ended and and requested respondents to list additional work in the home economics curriculum that they believed would strengthen the education major. Most of the listings were self-explanatory; however, some may need a brief explanation. The recommendation receiving the most responses (34%) was for the inclusion of more "How To" classes in the curriculum as opposed to theoretical classes. The respondents wanted personal classroom experience in method and subject matter classes which would permit them to "teach" some of the content in the subject matter areas rather than passively receive principles and generalizations. Secondly, the respondents (26%) recommended that more behavioral sciences be added to the curriculum, both theoretical and applied. Specific recommendations called for increased emphasis on areas such as interpersonal relationships, family relationships, psychology, human growth and development, and motivation. Two other recommendations should be noted: (1) that of the inclusion of science classes in the curriculum that would be

Table 24. Recommendations of respondents for additional work in the home economics curriculum to strengthen the home economics education major

	Years of teaching experience													
	1-5		6-10		11-15		16-20		Over 20		Unknown		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Behavioral Sciences	55	26	10	17	14	47	4	18	5	26	3	30	91	26
Physical Sciences	12	6			1	3							13	4
Art, Audio Visual Aids, etc.	29	14	6	10	7	23	2	9	3	16	1	10	48	14
Additional Management and Consumer Education	22	11	8	13			3	14	1	5	2	20	36	10
"How To" Classes	70	34	25	42	6	20	6	27	7	37	4	40	118	34
Working with Exceptional or Disadvantaged Groups	8	4	1	2			1	5					10	3
Science Classes for Home Ec.	16	8	8	13	3	10	4	18	2	11	1	10	34	10
Work on Scope & Sequence	12	6			1	3			2	11			15	4
Department Management	6	3	3	5									9	3
Housing and Home Furnishing	9	4									2	20	11	3
More Meaningful Ed. Classes	19	9	7	12					4	21			30	9
Humanities & Social Sciences	4	2	2	3	2	7			1	5			9	3
Fewer Required Courses					1	3							1	.3
Instructor Should Exemplify H.E.							1	5					1	.3
Home Economics for Boys									1	5			1	.3
Refresher Courses at Graduate Level	3	1									1	10	4	1
Less Emphasis on Chemistry	3	1	1	2			1	5					5	1
Clothing and Textiles	4	2											4	1
General Nursing	3	1											3	.9
Modeling & Grooming, etc.	2	1			1	3	2	9					5	1
No Response	62	30	20	33	4	13	11	50	7	37	5	50	109	31

designed specifically for home economics majors so that the principles taught were readily applicable to home economics subject matter areas and (2) "more meaningful professional education classes." Recommendations such as the following were included: a longer student teaching experience, student teaching earlier so that education classes would have more meaning, and education classes that were more applicable to classroom situations. Thirty-one percent (31%) of the respondents did not reply to the question.

Chapter IV

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

Most colleges and universities required chemistry as a prerequisite for home economics courses with very few options or alternatives being offered to candidates seeking a bachelor's degree in home economics education. In colleges offering options, many candidates for a bachelor's degree in home economics education still completed some type of chemistry course.

How respondees used chemistry specifically was not part of the investigation; however, the findings indicated that while many teachers found chemistry useful, chemistry principles were not directly applicable to classroom teaching. Nor, did respondees, in spite of this difficulty, do any reviewing or learning of new chemistry principles. Foods, Nutrition and Textiles were the subject matter areas in which chemistry principles were used most often.

While respondents indicated that their college instructors applied chemistry principles to their undergraduate home economics courses, many teachers surveyed believed that chemistry principles used in undergraduate home economics courses could have been sufficiently explained without chemistry as a prerequisite.

The teachers believed that not all major areas in home economics needed chemistry as a prerequisite; however, the majority thought that a chemistry background was definitely necessary for a Food and Nutrition and a Textiles and Related Areas major.

Within the home economics education major, skill oriented classes were listed as the most helpful classes. Professional education classes and home management courses were consistentl: listed at the top the least helpful lists.

Art and Related Classes were rated very highly as the most helpful courses taken outside home economics. Courses taken outside home economics found to be least helpful to the teachers in their teaching were Professional Education classes and Science courses.

A majority of the teachers surveyed indicated the need for increased emphasis in the behavioral sciences in the home economics curriculum. This increased emphasis on behavioral sciences included courses in both the applied and theoretical areas.

The teachers surveyed indicated that the home economics education major did not need as much work in the physical sciences as is now recommended or required. The teachers believed that work in the "life" sciences was of more value than the work in the "physical" sciences.

Conclusions

From the review of literature, the writer concluded that new trends were appearing in education and society. It also seemed apparent that too few home economics education curricula were viable in meeting more liberal trends in general education for future teachers where the emphasis was in the areas of behavioral and social sciences. A scientifically oriented curriculum did not seem to be meeting the challenges presented by the society and education of today.

From the findings of the survey, the writer concluded that present chemistry requirements imposed a real dilemma to the home economics

education major. Apparently, even though many teachers found chemistry principles useful, these were not directly applicable to their classroom teaching. Thus:

1. Generally, principles being taught in undergraduate chemistry courses were not directly applicable to home economics subject matter areas.
2. Perhaps chemistry need not be the only exact science option for a bachelor's degree in home economics education.
3. Home economics education graduates indicated a need for greater flexibility in the science area at the undergraduate level.

Some home economics subject matter areas and professional education courses also posed problems for the home economics education majors as shown in the findings. Specifically the writer concluded:

1. Skill oriented classes were consistently listed as most helpful classes. Perhaps this was because so many junior and senior high school curriculums consisted primarily of these kinds of courses. However, courses such as Child Development and Home Management, which have been included in many secondary home economics programs for a period of years, were rather constantly being mentioned as being "most helpful." This was an indication to the writer that such courses were broadening their scope of study.
2. Professional education courses, not taught in the home economics education department, and Home Management courses were consistently mentioned as "least helpful." This indicated to the writer that such courses were not being presented to home economics education undergraduates in such a manner that information was applicable to classroom situations.

3. Careful assessment of professional education classes needs to be undertaken to insure more relevancy to present day needs.
4. The respondees indicated a need for more emphasis in the behavioral science area. Therefore, some consideration might be given to reduction of core requirements in the home economics education curriculum, thus allowing greater individual option to emphasize areas of special need and interest.

Recommendations

On the basis of this study the researcher would make the following recommendations:

1. That options be provided for the home economics education major to allow greater flexibility. Two options are suggested: (1) a science option providing a choice between various science sequences, and (2) a general survey course presenting basic chemistry principles. Application of these principles would be taught directly in home economics subject matter courses.
2. That the required core courses be minimal in order that candidates have greater elective option to emphasize areas of need and interest.
3. That professional education classes be carefully examined for pertinency to present day realities.

The following recommendations for follow-up studies would also be made by the researcher:

1. Determine whether a chemistry course designed specifically for home economics majors is desirable and would more effectively meet present day needs of home economics majors.

2. Determine the actual use home economics teachers are making of chemistry in their teaching at the secondary level.
3. Investigate in further depth factors and reasons affecting respondents' listings of courses classified as "Most Helpful" and "Least Helpful."
4. Determine why Professional Education classes and Home Management classes were consistently listed as least helpful to teachers.
5. Obtain further specific recommendations for additional work in the behavioral sciences.
6. Investigate further the recommendations made by the teachers in this study for strengthening the home economics education major.

LITERATURE CITED

Albanese, Naomi. 1962. Home economics in higher education. Journal of Home Economics 54:534-536.

Amidon, Edna P. 1960. New explorations in home economics education. Journal of Home Economics 52:624-630.

Anonymous. 1963. Core of 18 credits is set for New York State College of home economics. Journal of Home Economics 55:778.

Anonymous. 1965. Home economics education syllabus. The State Education Department; Bureau of Home Economics Education; University of the State of New York, Albany, New York. pp. 5-12.

Berg, Janice and Others. 1965. College women speak about themselves and about home economics. Journal of Home Economics 57:626-628.

Blackwell, Gordon W. 1962. The place of home economics in American society. Journal of Home Economics 54:447-450.

Branegan, Gladys and Others. 1949. Home economics in higher education. American Home Economics Association, Washington, D.C. pp. 40-78.

Brown, Theresa Kennedy. 1960. A study of home economics graduates at Morgan State College, Baltimore, Maryland, from 1944-1953. Doctor's thesis, New York University, New York, New York. (Original not seen; abstracted in Journal of Home Economics 52:209. March, 1960).

Chadderdon, Hester and Alyce M. Fanslow. 1966. Review and synthesis of research in home economics education. Center for Applied Research and Leadership Development in Vocational and Technical Education, Ohio State University, Columbus, Ohio. 104 p.

Chapman, Lillie L. and Others. 1952. Chemistry and/or physical science. Educational Administration and Supervision 38:474-479.

Chilman, Catherine S. 1965. Child-rearing and family life patterns of the very poor: implications for home economists. Working with low income families. American Home Economics Association, Washington, D.C. 239 p.

Collins, John. 1965. Blending liberal arts and professional training. Pennsylvania School Journal 114:114-115.

Coon, Beulah. 1964. Home economics instruction in the secondary schools. The Center of Applied Research in Education, Washington, D.C. pp. 99-109.

Cowley, W. H. 1960. Three curricular conflicts. Liberal Education 46:467-483.

Davis, Allison. 1965. Changing the culture of the disadvantaged student. Working with low income families. American Home Economics Association, Washington, D.C. 239 p.

DuBois, May. 1952. An evaluation of the curricula of the school of home economics, Oregon State College, based on judgments of graduates. Journal of Home Economics 44:40-41.

Fehlman, Hazel. 1954. Graduates evaluate a curriculum core. Journal of Home Economics 46:10-12.

Grant, Margaret A. 1953. The preparation of homemaking teachers: ten years experience at the New York State College for teachers at Buffalo. Journal of Home Economics 45:201-202.

Hall, Olive A. 1958. Factors related to achievement of home economics majors in chemistry. Journal of Home Economics 50:767-768.

Hannah, John A. 1963. Education for the jet age. Journal of Home Economics 55:745-749.

Hazard, William R. and Others. 1967. The tutorial and clinical program for teacher education. Journal of Teacher Education (Fall, 1967).

Henderson, Grace M. 1965. Issues confronting home economics in colleges and universities. Journal of Home Economics 57:759-764.

Horn, Marilyn J. 1963. Curriculum change--how widespread? Journal of Home Economics 55:237-240.

Huebner, Max S. and Richard J. Mueller. 1964. High school principles assess undergraduate teacher preparation. Illinois Education 53:168, 176.

Johnson, Audrey M. 1962. Need we recenter home economics teaching? Journal of Home Economics 54:44-46.

Lea, Sonya A. 1963. Beliefs concerning Oregon State University home economics courses for potential secondary home economics teachers. Master's thesis, Oregon State University, Corvallis, Oregon. 206 p. (Original not seen; abstracted in Review and Synthesis of Research in Home Economics, 1966, pp. 62-62.)

Leahy, Dorothy M. 1953. Why drop-outs in college home economics? Journal of Home Economics 45:651-653.

Lyle, Mary S. 1957. Graduates reflect on their education. Journal of Home Economics 49:9-12.

Lyng, Anne. 1960. Using science in our profession. Journal of Home Economics 52:821-824.

Martin, Edna. 1953. Trends in home economics education. Journal of Home Economics 45:23-24.

Miller, James G. 1960. Know the behavioral sciences. Journal of Home Economics Education 52:327-330.

Ostler, Ruth Ellen and Florence E. Wagner. 1964. New York State curriculum revision: conception to implementation. Journal of Home Economics 56:689-692.

Simpson, Elizabeth Jane. 1965. The present challenge in curriculum development in home economics. Illinois Teacher of Home Economics 9:1-21.

Spencer, Mabel Sidell. 1960. An analytical study of the various home economics education curricula in selected land grant colleges of the North Atlantic Region. Doctor's thesis, The American University, Washington, D.C. (Original not seen; abstracted in Journal of Home Economics 52:213-214, March, 1960.)

Spitze, Hazel Taylor. 1965. The structure of home economics as a basis for curriculum decisions. Illinois Teacher of Home Economics 9:62-96.

Stephens, Shelby Mitcham. 1958. An evaluation of the college home economics curriculum in selected colleges in the southern region of the United States. Doctor's thesis, Cornell University, Ithaca, New York. (Original not seen; abstracted in Journal of Home Economics 50:225, March, 1958.)

Stevens, Harriet A. and Margaret O. Osborn. 1965. Characteristics of home economics graduates. Journal of Home Economics 57:773-777.

Talboy, Ruth A. 1952. Studying family life curriculum. Journal of Home Economics 44:187-189.

Temple, Wathene E. 1953. A study of the basic course in the division of home economics, Oklahoma Agricultural and Mechanical College. Doctor's thesis, Oklahoma Agriculture and Mechanical College, Stillwater, Oklahoma. (Original not seen; abstracted in Journal of Home Economics 45:204-205, March, 1963.)

Tinsley, Willa Vaughn. 1966. Changes in the university scene: their effect on home economics. The adventure of change. American Home Economics Association, Washington, D.C. 73 p.

Whitehead, Floy Eugenia. 1965. Home economics and liberal arts in today's university. Journal of Home Economics 57:613-618.

Whitehead, Floy Eugenia; Margaret O. Osborn; and Harriet A. Stevens. 1965. Selected characteristics of majors in home economics, sociology, language, and art. Journal of Home Economics 57:705-710.

Whitmarsh, Ruth. 1964. Opinions of city home economics supervisors on the employment emphasis in home economics education at the secondary level. Illinois Teacher of Home Economics 7:59-66.

A P P E N D I X

Table 25. Chemistry requirements of home economics education majors in land grant universities

State	University	Chemistry Requirements	Alternatives
Alabama	Auburn University	General Chemistry	None
Alaska	Univ. of Alaska	General Chemistry	None
Arizona	Univ. of Arizona	General Chemistry	None
Arkansas	Univ. of Arkansas	10 units chemistry	None
Calif.	U. C. at Davis	General Chemistry Organic (brief)	None
Colorado	Colo. State Univ.	Fundamental Chemistry Fund. Org. Chemistry	None
Conn.	U. of Connecticut	Intro. to Chemistry	Gen. Chem.
Delaware	Univ. of Delaware	General Chemistry Elementary Organic Elementary Biochemistry	None
Georgia	Univ. of Georgia	General Chemistry Organic Chemistry	None
Hawaii	Univ. of Hawaii	General Chemistry	Survey of Chemistry
Idaho	Univ. of Idaho	Intro. to Chemistry	or Prin. of Chemistry
		General Chemistry	or Carbon Compounds
Illinois	Univ. of Illinois	General Chemistry Organic Chemistry	None
Indiana	Purdue University	General Chemistry Organic Chemistry	None
Iowa	Iowa State Univ.	General Chemistry Elementary Organic	None
Kansas	Kansas St. Univ.	General Chemistry Elementary Organic Chem.	None
Kentucky	Univ. of Kentucky	Elementary College Chem.	or General Col. Chem. or Elem. College Phys. or General Col. Physics

Table 25. Continued

State	University	Chemistry Requirements	Alternatives
Louisiana	Louisiana St. U.	Inorganic Chemistry Organic Chemistry	None
Maine	Univ. of Maine	Physical Science (Must be lab science; Biochemistry taken by most)	Bacteriology, Biochemistry, Botany, Chem., Physics, Geology, or Zoology
Maryland	Univ. of Maryland	General Chemistry	None
Massachusetts	Univ. of Mass.	General Chemistry Organic Chemistry	None
Michigan	Mich. State U.	Intro. Chemistry (includes organic) Intro. Biochemistry	None
Minnesota	Univ. of Minn.	General Chemistry Elementary Biochemistry	or Elem. Organ. Chemistry
Mississippi	Miss. State Univ.	Does not offer program for B.S. or B.A. in Home Economics Education	
Missouri	Univ. of Missouri	Intro. Chemistry	or Gen. Chem.
Montana	Montana State U.	Introduction to General and Biological Chemistry	None
Nebraska	Univ. of Nebraska	Natural Science	Chem.,Phys., Geology, Math Biology,Botany Zoology,Physio.
Nevada	Univ. of Nevada	General Chemistry	None
New Hamp.	U. of New Hamp.	6 credits Natural Science	Biology,Chem., Geol., Botany, Math, Phys., Science, Phys., Zoology
New Mexico	New Mexico St. U.	Chemistry in Our Time	None
New York	Cornell Univ.	Intro. to Chemistry	or General Chem.

Table 25. Continued

State	University	Chemistry Requirements	Alternatives
North Car.	U. of North Carolina at Greensboro	General Chemistry	None
North Dak.	N. Dak. St. U.	General Chemistry	
	Option I	(13 credits from Organic (Chemistry (((11 credits from Soc.-Behavioral Sci.,	or Elements of Biochemistry or General Bacteriology
	Option II	(food handling practices; 4 credits of Nat. Science	
Ohio	Ohio State U.	General Chemistry	or Elementary Chem.
Okla.	Oklahoma St. U.	General Chemistry	Various Gen. Chem. courses according to dept. require.
Oregon	Oregon State U.	General Chemistry	or General Biol.
Pennsylvania	Penn. State Univ.	Introductory Chemistry Organic Chemistry	None
Rhode Island	University of Rhode Island	General Chemistry	None
South Car.	Clemson University	No Home Economics Dept.	
South Dak.	So. Dak. St. U.	General Chemistry	None
Tennessee	U. of Tennessee	General Chemistry	None
Utah	Utah State Univ.	General Chemistry Elementary Organic	None
Vermont	Univ. of Vermont	Outline of Chemistry	None
Virginia	Va. State College	General Chemistry Organic Chemistry	None
	Va Polytech.	General Chemistry Additional Credit in	None Zoology, Physics, Biochem. or Org. Chem.
Washington	Washington State	General Chemistry Organic Chemistry	Elem. Bact. or Phys. Science Zoology (Intro to Human Physio.)

Table 25. Continued

State	University	Chemistry Requirements	Alternatives
West Virginia	West Virginia University	Biology 1 & 2	or Physical Sci. 1 & 2
		Math 21 & 22	or Math 15
Wisconsin	Univ. of Wisconsin	General Chemistry Biochemistry	None
Wyoming	Univ. of Wyoming	General Chemistry Intro. Organic Chemistry	None

Table 26. Chemistry requirements of home economics education majors in state universities

State	University	Chemistry Requirements	Alternatives
Arizona	Arizona State Univ.	Introduction to Chemistry	or College Chem.
Arkansas	Southern State College	General Chemistry Organic Chemistry	None
Colorado	Colo. State Col.	Principles of Chemistry	None
Florida	Florida State U.	Inorganic Chemistry Organic Chemistry	None
Georgia	Fort Valley State College	General Inorganic Organic Chemistry	None
Idaho	Idaho State Univ.	Natural Science	None
Illinois	No. Ill. Univ.	General Chemistry Intro Organic Chemistry	None
Indiana	Indiana Univ.	Elementary Chemistry	Physiology
Iowa	Univ. of Iowa	General Chemistry Elementary Organic	or Adv. Gen. Chem. or Organic Chem.
Kansas	Kansas State College at Pittsburg	Intro. Chemistry Organic Chemistry	None
Kentucky	East. Kentucky U.	General Chemistry	None
Louisiana	So. La. College	General Chemistry	None
Maryland	Maryland St. Col.	General Chemistry Elementary Org. Chemistry	None
Minnesota	Mankato St. Col.	General Chemistry	None
Mississippi	Univ. of Miss.	Survey of Chemistry	None
Missouri	Mo. State Teachers College	General Chemistry	None
Montana	Univ. of Montana	General Chemistry Survey of Organic Chemistry	None
Nebraska	Univ. of Omaha	College Chemistry Elementary Organic	or Elem. Chem. Principles

Table 26. Continued

State	University	Chemistry Requirements	Alternatives
New Mexico	Eastern N.M. Univ.	Chemistry for Gen. Ed.	None
New York	Brooklyn College	General Chemistry	or Science 1,2,3
North Car.	Appalachia St. U.	Applied Chemistry	None
Ohio	Kent State Univ.	General Chemistry	None
Oklahoma	Central State Col.	General Chemistry	None
Oregon	Oregon Col. of Ed.	General Chemistry	None
Pennsyl-vania	Mansfield St. Col.	Inorganic Chemistry Organic Chemistry	None
South Dak.	U. of So. Dak.	General Chemistry	None
Tennessee	E. Tenn. St. U.	General Chemistry	None
Texas	No. Texas St. U.	General Chemistry	None
Utah	Univ. of Utah	General Chemistry Elementary Organic	None
Virginia	Madison College	Chemistry in Mordern Wor.	None
Washington	Univ. of Wash.	General Chemistry Organic Chemistry	None
West Virginia	Fairmont St. Co.	General Chemistry	None
Wisconsin	Wisconsin St. U.	Basic Chemistry Elem. Biochemistry	None

Table 27. Chemistry requirements of home economics education majors in private universities

State	University	Chemistry Requirements	Alternatives
Alabama	Huntington Col.	General Chemistry	None
Arkansas	Harding College	General Chemistry	None
Florida	Berry College	Fundamentals of Inorganic & Organic Chemistry	None
Georgia	Berry College	Intro. Inorganic Intro. Organic	None
Hawaii	Church College of Hawaii	Inorganic Chemistry Organic Chemistry	None
Illinois	Olivet Nazarene College	10 hours of chemistry (Intro. and General)	None
Indiana	Evansville Col.	General Chemistry Elementary Chemistry	None
Iowa	Westmar College	General Chemistry	None
Kansas	Friends University	General Chemistry Inorganic Chemistry	None
Kentucky	Berea College	Fund. of Inorganic Fund. of Biochemistry	None
Maryland	Hood College	General Chemistry	None
Mass.	Simmons College	1 yr. General Chemistry	None
Michigan	Andrews University	Natural Science & Math	None
Minn.	Concordia College	General Chemistry	None
Miss.	Miss. College	General Inorganic Chem.	None
New York	Marymount College	General Chemistry Elem. Organic Chem.	None
North Car.	Bennett College	College Chemistry	None
Ohio	Ashland College	Principles of Chemistry	None
Oklahoma	Oklahoma Baptist University	Intro General Chemistry Intro. Organic Chemistry <u>or</u>	Intro. Gen. Chem. & Biol.112 (Gen. Zoology)

Table 27. Continued

State	University	Chemistry Requirements	Alternatives
Oregon	Linfield College	8 Hours Chemistry	or 8 Hours Anatomy
Penn.	Messiah College	General Chemistry	None
Utah	Brigham Young U.	Intro. Chemistry Intro. Organic Chemistry	None
Washington	U. of Puget So.	General Chemistry	None

COVER LETTER

The Vocational Department of the State Department of Public Instruction has authorized a study through the sponsorship of the State Research Coordinating Unit to examine curriculum requirements of Home Economics Education majors. Particularly, the study is concerned with science courses which are prerequisite to subject matter areas in the major and must therefore be completed by those seeking a B.S. degree in Home Economics Education.

In order to obtain information that can be used as a basis for recommendations for curriculum change, home economics teachers throughout Texas, Oregon, and Utah are being contacted concerning: (1) course work required in the exact sciences, (2) classroom use made of such background knowledge gained from the exact science area, and (3) recommendations for curriculum change.

Your cooperation in completing the questionnaire and returning it in the enclosed self-addressed envelope will be greatly appreciated.

Thank you for your time and effort.

Sincerely,

Barbara C. Major
Research Assistant
c/o Austin G. Loveless
Utah State University
Logan, Utah 84321

BCM:db
Enclosure

FOLLOW-UP LETTER

Several weeks ago, you received a questionnaire sent by Utah's State Research Coordinating Unit concerning the curriculum requirements of Home Economics Education majors.

Although our letters have probably crossed in the mail, so far, I have not received a completed questionnaire from you. Your completed questionnaire will greatly facilitate our study and provides a way for you to contribute to the improvement of education.

If you have not completed the questionnaire, would you please take just a few minutes to fill it out and return it to us in the self-addressed envelope that was provided for you as soon as possible?

Thank you again for your cooperation.

Sincerely,

Barbara C. Major
Research Assistant
c/o Austin G. Loveless
Utah State University
Logan, Utah 84321

BCM:db

As a part of a research project being conducted by the State of Utah through State Research Coordinating Unit, we are doing research on curriculum requirements of Home Economics Education majors. Presently, we are doing a survey of land-grant, state and private universities; however, we are having difficulty locating such institutions within the state of California.

Would you please send us a list of those colleges or universities within your state which offer a program leading to a B.S. degree in Home Economics Education. Any help you could give us would be appreciated.

Thank you for your time and effort.

Sincerely,

Barbara C. Major
Research Assistant
c/o Austin G. Loveless
Utah State University
Logan, Utah 84321

BCM:db

As a part of a research project being conducted by the State Research Coordinating Unit, we are doing research on curriculum requirements of Home Economics Education majors. Presently, we are conducting a survey of land-grant, state, and private universities; however, we are having trouble locating the names of private universities which offer a home economics program.

Would it be possible for you to send us a list of private colleges and universities offering such a program. Any help you could give us would be greatly appreciated.

Thank you for your time and effort.

Sincerely,

Barbara C. Major
Research Assistant
c/o Austin G. Loveless
Utah State University
Logan, Utah 84321

BCM:db

Dear Department Chairman:

As a part of a research project being conducted by the State Research Coordinating Unit at Utah State University, we are doing research on curriculum requirements of Home Economics Education majors. Particularly, we are interested in the science requirements that must be completed by your students prior to their graduation.

Would you please send us a copy of the curriculum that would be followed by a student seeking a B.S. degree in Home Economics Education.

Thank you for your cooperation.

Sincerely,

Barbara C. Major
Research Assistant
c/o Austin G. Loveless
Utah State University
Logan, Utah 84321

BCM:db

Name_____

Institution granting bachelor's degree_____ Year_____

Years of teaching experience in: Foods_____Clothing_____Textiles_____

Home Living_____Related Areas_____

1. Which of the following science courses did you take to complete the requirements for a degree in Home Economics Education? (Please indicate the course or courses that you took by indicating the number of semesters or quarters completed):

	One Sem.	Two Sem.	One Qtr.	Two Qtr.	Three Qtr.
Botany	_____	_____	_____	_____	_____
Biology	_____	_____	_____	_____	_____
(General	_____	_____	_____	_____	_____
Chemistry (Inorganic	_____	_____	_____	_____	_____
(Organic	_____	_____	_____	_____	_____
Microbiology	_____	_____	_____	_____	_____
Physical Science	_____	_____	_____	_____	_____
Physics	_____	_____	_____	_____	_____
Physiology	_____	_____	_____	_____	_____
Zoology	_____	_____	_____	_____	_____
Other_____	_____	_____	_____	_____	_____
None Required_____	_____	_____	_____	_____	_____

2. (a) Do you find the principles of the chemistry courses checked above <u>useful</u> in your teaching?___Extremely Useful ___Most Useful ___Useful ___Little Use ___No Use

(b) Do you find that you can <u>apply</u> the chemistry knowledge gained from the courses you checked above directly in your teaching? ___Always ___Very Often ___Often ___Once in a While ___Never

(c) In which specific subject matter areas do you use the chemistry knowledge gained from the course work? ___Foods ___Nutrition ___Textiles ___Laundering ___Clothing Care ___Child Development ___Other_____

(d) Do you need to review or learn other chemistry principles in order to use chemistry in your teaching? ___Always ___Very Often ___Often ___Once in a While ___Never

3. (a) In your undergraduate curriculum, what course(s) did you take that required chemistry as a prerequisite? ___Foods ___Nutrition ___Textiles ___None ___Other_____

(b) In the undergraduate subject matter area in which chemistry was required, did your instructor <u>apply</u> the chemistry principles to the subject matter? ___Always ___Very Often ___Often ___Sometimes ___Never

(c) Do you believe that the chemistry principles used in your home economics courses could have been sufficiently explained for the purpose of the class <u>without</u> chemistry as a prerequisite? ___Yes ___No

4. You undoubtedly enrolled in food and nutrition classes and textile classes that made some use of chemistry principles. Could you, as a student, make the application from your chemistry background? _____Yes _____No, or did your instructor have to clarify the application? _____Yes _____No.

5. There are several Home Economics majors listed below. There may be some that you believe should have chemistry as a prerequisite for a basic understanding of the subject matter. Please indicate these by checking the appropriate column.

	Necessary	Not Necessary
General Home Economics		
Home Mgt. and Family Economics		
Home Economics Education		
Food and Nutrition		
Textiles and Related Areas		
Child Development		
Other_____		

6. Your home economics major required work in Family and Child Development; Food and Nutrition; Clothing and Textiles, Household Economics and Management; Home Economics Education; and professional education courses. You may have found course work helpful because of the content of the course or from the way the course was taught. List classes from the above areas that you have found most helpful and least helpful in your teaching.

Content		Way Taught	
Most Helpful	Least Helpful	Most Helpful	Least Helpful

7. You may have found some courses outside home economics that are particularly helpful to you in your teaching (i.e., Art, Literature, Mathematics, etc.) Please list in the following spaces classes that are helpful.

8. You may have found some required courses outside home economics that were not helpful to you in your teaching. Please list them in the following spaces.

9. (a) At the college level, behavioral sciences may be defined as those sciences which have impact on human problems of the individual and interpersonal relationships. In terms of your teaching experiences, do you believe that more emphasis should be put on the behavioral science areas in the home economics curriculum? ___Yes ___No

(b) If you indicated "Yes," what specific courses would you recommend be added to the home economics curriculum at the college level (i.e., Adolescent Psychology, Anthropology, Sociology, etc.)

(c) There may be courses defined as applied that you believe would be helpful. Some examples would be family relationships; courses on low-income families or disadvantaged children; course work on writing tests or other evaluation devices. Do you believe more of these should be in the curriculum? ___Yes ___No

10. (a) Do you believe that emphasis should continue to be on the physical sciences, (Chemistry, Mathematics, Physics) in the home economics curriculum for:

Your general education	___Yes	___No
Your teaching	___Yes	___No
Your pursuit of graduate work	___Yes	___No

(b) Regardless of your answer to (a), there may be other science courses that you believe would make a worthwhile contribution to your major (i.e., Microbiology, Bacteriology, Physiology, Biology, etc.). List some science courses you beleieve would strengthen your major.

_____ _____ _____ _____

11. Please list your recommendations for additional work that you believe should have more emphasis in order to strengthen the major.